

‘Six Sigma Technique’: A Journey Through its Implementation

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ABSTRACT

The manufacturing industries all over the world are facing tough challenges for growth, development and sustainability in today's competitive environment. They have to achieve apex position by adapting with the global competitive environment by delivering goods and services at low cost, prime quality and better price to increase wealth and consumer satisfaction. Cost Management ensures profit, growth and sustainability of the business with implementation of Continuous Improvement Technique like Six Sigma. This leads to optimize Business performance. The method drives for customer satisfaction, low variation, reduction in waste and cycle time resulting into a competitive advantage over other industries which did not implement it. The main objective of this paper ‘Six Sigma Technique: A Journey Through Its Implementation’ is to conceptualize the effectiveness of Six Sigma Technique through the journey of its implementation.

KEYWORDS: *Cost Accounting, Traditional Costing Methods, Six Sigma Technique, Continuous Improvement and Efficiency in Performance.*

INTRODUCTION

The cost accounting system provides information useful for cost control, pricing of a product; formulation or change in the process, raw material management, etc. The costing system should take into consideration the trends followed in the market as it affects the product cost although it is not directly related to production cost. As observed by Tsifora, Evdokia and Chatzoglou, Prodromos D (2016), evolution of costing process for the period 1985 to 2015 conducted with a field survey to examine the development and innovation in the costing process during the period on the basis of technological progress, changes in production and costing system, and the changes in the costing information used for managerial decisions. The use of modern costing system helped the organization to take many strategic decisions efficiently highlighting the fact that it is more beneficial as compared to the traditional costing system.

Companies follow various methods and techniques to manage their cost. Observing the current trend and opportunities, companies have started shifting from conventional methods to modern methods. The modern approach includes techniques like Six Sigma,

Just-in-time, TQM, etc. The costing system implemented should measure the performance and development of the product. The reports obtained should be helpful for a proper governance, control and improve the cost effectiveness and efficiency of the company.

Evolution of Six Sigma Technique

Concept of Six Sigma was coined by the Motorola Corporation in the late 1980s. The fundamental principle of this latent defect theory was to eliminate deviation in production and services and their processes so that defects are kept down and customer satisfaction is attained. In this theory the variation in manufacturing processes becomes the main culprit for defects. Elimination of these defects will save money as well as escalate customer satisfaction. This deviation was calculated with the help of ‘sigma’. This theory was later re-developed in 1995 by Jack Welch as a prime concept in business strategy of General Electric.

Six Sigma is a popular quality and process improvement methodology and a statistical concept that defines deviations existing in the process. The focus is on reducing process deviation and improve

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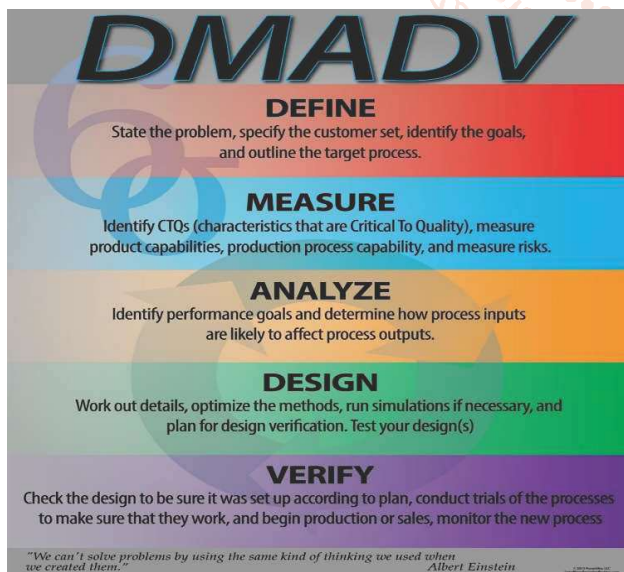
process effectiveness. Some of the principles that govern Six Sigma are – Customer-Focused Improvement, Continuous Process Improvement, Variation, Removing Waste, Equipping People and Controlling the Process. Six Sigma approach can be implemented at a very early stage of identification of need for improvement initiative.

Shokri, Alireza. (2017), explains Six Sigma as a means of managing global competitiveness through continuous improvement and business excellence fostering a strategic and systematic alignment of quality and statistical thinking.

Implementation of Six Sigma:

Linderman, K. (2003), suggests Six Sigma as a organized and structured method for strategic process improvement, product development that relies on statistical methods and the scientific method to make dramatic reductions in customer defined defect rates. The process improvement is attained by pattern of Plan, Do, Check, Act (PDCA) cycle.

The Six Sigma Technique is implemented by two methods viz. DMADV and DMAIC. Define, Measure, Analyse, Design and Verify (DMADV) is used for item outline before assembling generally applied to refine the assembling process through decrease of variation. It proposes to eradicate the disparity between what the customer needs and what was actually designed. This strategy ought to be executed when an administration or item needs to be grown in an organization where does not as of now exist or has not achieved the certain sigma level.



DMAIC stands for Define, Measure, Analyse, Improve and Control. The 'Define' stage identifies the necessary features that customers consider significantly, production processes that support the features along with the elements of the process. In the 'Measure' stage, key characteristics identified are categorized. The verification systems for measuring measurement systems are also done with collection of relevant data. In the next step of 'Analyse', the raw data collected is compiled in a format required to identify defects. In the step of 'Improve', the company identifies the steps to be taken to overcome the defects identified. The changes made are also reassessed to ensure the benefits derived from such change. Lastly, in the step of 'Control', if the processes performance is satisfactory the process is adopted. Here, the process is also monitored as way of ensuring that there are no unexpected changes.



The main aim of this structure is to achieve Six Sigma at every stage of development of product. Gradually this technique got famous and was implemented in various industries. The major principles are – Customer-Focused Improvement, Continuous Process Improvement, Variation, Eliminating Waste, Training People and Controlling the Process. It is a strategic initiative to boost profitability, increase market share and improve customer satisfaction leading to breakthrough quantum gains in quality. The Six Sigma technique can be summarized as follows –

Figure 1: The Value of Defect Percentage under various Sigma Levels

Sigma Level	Defects Per Million Opportunities	Defects (%)	Yield (%)	Interpretation
1	6,91,462	69	31	Loss
2	3,08,538	31	69	Non-Competitive
3	66,807	6.7	93.30	Average
4	6,210	0.62	99.38	Above Average
5	233	0.023	99.977	Below Maximum Productivity
6	3.4	0.00034	99.99966	Near Perfection

Source: Adapted from ICAI Study Module – Lean System and Innovation

Trimarjoko, Aris & Purba, Humiras & Nindiani, Aina. (2020), observed that the causes of variations in any manufacturing industry is generally caused by 4M 1E factors viz. Man, Machine, Material, Method and Environment. Six Sigma consists of an efficient and well governed method widely known as DMAIC which has proven to be efficient in enhancing the process capability.

Aboelimged, Mohamed. (2010), suggested that successful implementation of Six Sigma quality is directly correlated with better financial performance and profit generation by means of reduction in process variability, cost of poor quality (COPQ), operational costs, in-process defect levels, cycle time, customer complaints, and maintenance inspection time; improving capacity cycle time, inventory on-time delivery, savings in capital expenditures, profitability, productivity, sales.

The Six Sigma model should be installed with six steps. The first step is to perform a strategic analysis on the bases of customer needs. The second step relates to improvement initiative which is established by a high-level, cross-functional team. The third step identifies overall improvement tools and techniques. The fourth step performs high-level process mapping and prioritizes improvement opportunities. These four steps form strategic decisions steps useful for decision making. The fifth and sixth steps relate to development of detailed plan and revise it as required. These are tactical decisions primarily involved in decision making process.

Zhang, M., Wang, W., Goh, T. N., & He, Z. (2014), in their case study derived that Six Sigma became an important driving principle for coping up the global competitiveness. It was observed that there has to be proper knowledge about core concepts of Six Sigma amongst the managers and support from them to other employees for the employees to implement the method. It has to be an essential daily routine amongst the staff.

Ricardo (2002) has identified factors affecting the implementation of Six Sigma Technique viz. – Management involvement and strategy, Effective communication, Proper infrastructure, Adequate

training to staff, Tools and Techniques, Project Specific skills, Prioritization and Linking Six Sigma with business strategy – Consumers – Human Resource – Supplier.

Conclusion:

Six Sigma is a popular quality and process improvement methodology and a statistical concept that defines variation existing in any process. The method targets to manufacture goods with negligible defects so as to meet the standards of the customer specifications. This method uses statistical tool of Sigma for elimination of variations in the production and services where there are only 3.4 defects per million opportunities (99.99966% error-free). Hence it can be said that Six Sigma provides maximum value to companies in the form of increased profits and consumer satisfaction through high-quality products at the lowest possible cost. The methodology is best described as a business excellence strategy, customer-driven, project-driven and business-driven.

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